

Big Bugs

Review #1 – Beta Lactam Antimicrobials

Bug	Characteristics	Common Infections	Common Treatment with β -lactam	Resistance and Treatment
Strep pyogenes	Gram (+) cocci in chains	Strep throat Cellulitis Erysipheles Scarlet fever Necrotizing faciitis	Pen G (IV) Procaine Pen G (IM) Benzathaine Pen G (IM) Pen V (PO)	Not yet
Strep pneumo	Gram (+) cocci in chains or as diplococci	CAP Otitis media Meningitis Sinusitis Bronchitis	Pen G (IV) Pen V (PO) Amoxicillin	PRSP - use vancomycin (IV) or other appropriate non beta lactam
Staph aureus (coag +) Staph epi (coag -)	Gram (+) cocci in clusters	Skin Pneumonia Bone Sepsis etc.	Nafcillin (IV) Dicloxacillin (PO)	If MRSA - use vancomycin (IV) or other appropriate non beta lactam
E. faecalis E. faecium	Gram (+) cocci	UTI Sepsis Catheter infections Endocarditis Nosocomial infections	Ampicillin (IV) Pen G (IV) No other beta lactams useful Note: E. faecium mostly resistant to all beta lactams, vancomycin and Synercid	Vancomycin is 1st choice if resistant to penicillins. If vancomycin resistant, then Zyvox® or Synercid® or daptomycin
Enterobacteriaceae:	Gram (-) rods			If resistant, do sensitivity tests to find an appropriate drug.
E. coli		UTI, traveler's diarrhea, etc.	Amoxicillin (PO) Amox/Clav (PO)	
Enterobacter		misc. nosocomial	Amp/Sulbactam (IV)	
Klebsiella		nosocomial pneumonia, etc.	2 - 4th generation cephalosporins	
Serratia		misc. nosocomial	Carbapenems	
Proteus		UTI	Aztreonam	
Morganella		UTI		
Providencia		UTI		
Citrobacter		UTI		
Salmonella		gut		
Shigella	gut			

Pseudomonas	Gram (-) rods	Burns Skin Bronchitis Sepsis UTI	Piperacillin (w/wo tazobactam) Ceftazidime (3rd gen cef) Cefepime (4th gen cef) a carbapenem (except ertapenem)	May combine with aminoglycosides. Resistance is common due to beta lactamases and restricted porin.
N. gonorrhoeae	Gram (-) cocci	Gonorrhoea	3rd gen PO cef: Vantin® (PO) stat dose ceftriaxone (IM/IV) stat dose	Produce β -lactamases
N. meningitidis	Gram (-) cocci	Meningitis	Pen G Cefuroxime or some 3rd gen cef (must cross into CNS) in Pen allergies	Not common
Bacteriodes fragilis	Gram (-) rods Anaerobe	Sepsis Abscess	Amp/sulbactam (IV)	Produce β -lactamase
Moraxella cat.	Gram (-) cocci	Otitis media Sinusitis Bronchitis	Augmentin or 2nd/3rd gen cephs	All produce β -lactamases
H. influenza	Pleomorphic Gram (-)	Otitis media Sinusitis Bronchitis	Augmentin or 2nd/3rd gen cephs	Many produce β -lactamases

Big Drugs

Drugs class	Antibiotics	Effective against	Special notes
Penicillins			
Simple penicillins	Pen G (IV/IM) Pen V (PO) (for mild infections)	Some Gram (+) (not Staph) Strep pyogenes, neisseria (Gram -)	Potent for Streptococcus If PRSP, use vancomycin
Penicillinase-resistant Pens	Nafcillin (IV) Dicloxacillin (PO)	Staph	If MRSA, use vancomycin
Amino-penicillins	Ampicillin (IV) Amoxicillin (PO)	Gram (+) (not Staph) Weak Gram (-) (not β -lactamases producing ones)	Will be hydrolyzed by penicillinases and β -lactamases
Extended-spectrum (Anti-pseudomonal)	Piperacillin (IV)	Many pseudomonas	
Penicillins with β -lactamase inhibitors	Amox/clav (PO) Amp/sulbactam	Gram (-) Broad spectrum	good for bugs resistant to Amox Amp/sulbactam: same and also anaerobes
	Ticarcillin/clav Pip/tazobactam	Good Gram (-) Pseudomonas in mixed infection	
Cephalosporins (PO)			
1st generation	Cephalexin	Gram (+) and some Gram (-)	
3rd generation	Cefdinir (suspension)	Better resistance to β -lactamases	PO for kids
	Cefpodoxime		Stat for gonorrhoea
Cephalosporins (IV)			
1st generation	Cefazolin	Gram (+) and some Gram (-)	
2nd generation	Cefuroxime	Better resistance to β -lactamases	Crosses into CNS
3rd generation	Cefotaxime		
	Ceftriaxone	N. gonorrhoea Excellent Gram (+)	Once daily drug Crosses into CNS
	Ceftazidime	Gram (-) including Pseud.	Crosses into CNS
4th generation	Cefepime	Gram (+) Gram (-) including Pseud.	Crosses into CNS
Carbapenems	Meropenem, Ertapenem	Gram (+) Gram (-) including Pseudomonas (except ertapenem)	Meropenem can be used in meningitis; ertapenem not for pseudomonas
	Imipenem		No meningitis indication

Monobactams	Aztreonam	Gram (-) only	Can use in penicillin allergy (anaphylactic)
--------------------	-----------	---------------	--

Special Note:

- Pregnancies - All β -lactams are okay
- In penicillin allergy (rash), give cephs
- Anaphylactic reaction: **PO: no suitable β -lactams**
 IV: aztreonam with caution (if infection is Gram (-))